CLAIMS

1. A method of generating an interpreted pattern of a mask layout feature, the mask layout including edges dissected into a plurality of segments, each segment having an evaluation point, the method comprising:

identifying a two-dimensional segment;

measuring an aerial image gradient at the evaluation point of the two-dimensional segment;

determining a normal shift for the two-dimensional segment based on the aerial image gradient at the evaluation point;

modifying a position of the segment using the normal shift; and

saving the modified position as part of the interpreted pattern.

2. The method of claim 1, wherein the interpreted pattern includes the modified positions of all two-dimensional segments.

3. The method of claim 1, wherein determining the normal shift for the two-dimensional segment includes:

determining a nominal Shift, a maximum normal shift component due to the aerial image gradient, a measured angle of the aerial image gradient, a base angle where no shift is applied, a maximum normal shift component due to the aerial image magnitude, a measured aerial image magnitude, and a base magnitude where no shift is applied.

4. The method of Claim 3, wherein determining the normal shift for the two-dimensional segment is computed using one of the following three equations:

$$\text{NormalShift} = -\frac{\text{GradientMagnitude}^2}{Q} - \frac{\text{GradientMagnitude}}{R} - S$$

$$\text{NormalShift} = T_0 - \mathit{AngleShift}\left(1 - \frac{\text{GradientAngle}}{\mathit{GradientAngle}_0}\right) - \mathit{MagShift}\left(1 - \frac{\text{GradientMagnitude}}{\mathit{GradientMagnitude}_0}\right)$$

$$\text{NormalShift} = -\frac{\text{GradientMagnitude}^2}{F} - \frac{\text{GradientAngle}^2}{G} - \frac{\text{GradientMagnitude}}{H} - \frac{\text{GradientAngle}}{J} - \frac{\text{GradientAngle} * \text{GradientMagnitude}}{K} - L$$

wherein F, G, H, J, K, L, Q, R, and S are empirically-derived fit constants based on sampled corner performance, T_0 is the nominal normal shift, *AngleShift* is the maximum normal shift component due to the aerial image gradient, GradientAngle is the measured angle of the aerial image gradient, $GradientAngle_0$ is the base angle where no shift is applied, *MagShift* is the maximum normal shift component due to the aerial image magnitude, GradientMagnitude is the measured aerial image magnitude, and $GradientMagnitude_0$ is the base magnitude where no shift is applied.

5. The method of claim 1, wherein the two-dimensional segment forms part of one of a line end, an outside corner, an inside corner, a slot, and a jog.

6. The method of claim 1, wherein the two-dimensional segment is optically influenced by one of a line end, an outside corner, an inside corner, a slot, and a jog.

7. A method of generating an interpreted pattern of a mask layout feature, the mask layout including edges dissected into a plurality of segments, the method comprising:

identifying a two-dimensional segment;

using an aerial image to determine an influence on that two-dimensional segment;

determining a normal shift for the two-dimensional segment based on the influence;

modifying a position of the segment using the normal shift; and

saving the modified position as part of the interpreted pattern.

8. The method of claim 7, wherein the interpreted pattern includes the modified positions of all two-dimensional segments.

9. The method of claim 7, wherein the influence includes an aerial image gradient, and wherein determining the normal shift for the two-dimensional segment includes:

determining a nominal Shift, a maximum normal shift component due to the aerial image gradient, a measured angle of the aerial image gradient, a base angle where no shift is applied, a maximum normal shift component due to the aerial image magnitude, a measured aerial image magnitude, and a base magnitude where no shift is applied.

10. The method of Claim 9, wherein determining the normal shift for the two-dimensional segment is computed using one of the following three equations:

$$\mathrm{NormalShift} = -\frac{\mathrm{GradientMagnitude}^2}{Q} - \frac{\mathrm{GradientMagnitude}}{R} - S$$

$$\text{NormalShift} = T_0 - \mathit{AngleShift}\left(1 - \frac{\text{GradientAngle}}{\mathit{GradientAngle}_0}\right) - \mathit{MagShift}\left(1 - \frac{\text{GradientMagnitude}}{\mathit{GradientMagnitude}_0}\right)$$

$$\text{NormalShift} = -\frac{\text{GradientMagnitude}^2}{F} - \frac{\text{GradientAngle}^2}{G} - \frac{\text{GradientMagnitude}}{H} - \frac{\text{GradientAngle}}{J} - \frac{\text{GradientAngle}*\text{GradientMagnitude}}{K} - L$$

wherein F, G, H, J, K, L, Q, R, and S are empirically-derived fit constants based on sampled corner performance, T_0 is the nominal normal shift, *AngleShift* is the maximum normal shift component due to the aerial image gradient, GradientAngle is the measured angle of the aerial image gradient, $\mathit{GradientAngle}_0$ is the base angle where no shift is applied, *MagShift* is the maximum normal shift component due to the aerial image magnitude, GradientMagnitude is the measured aerial image magnitude, and $\mathit{GradientMagnitude}_0$ is the base magnitude where no shift is applied.

11. The method of claim 7, wherein the two-dimensional segment forms part of one of a line end, an outside corner, an inside corner, a slot, and a jog.

12. The method of claim 7, wherein the two-dimensional segment is optically influenced by one of a line end, an outside corner, an inside corner, a slot, and a jog.

13. A method of performing optical proximity correction on a mask layout, the method comprising:

receiving the mask layout, the mask layout including a plurality of features;

performing interpretation filtering to generate an interpreted pattern for at least one feature; and

running optical proximity correction using the interpreted pattern.

14. The method of claim 13, further including dissecting edges of the features, thereby forming a plurality of segments.

15. The method of claim 14, further including identifying two-dimensional segments.

16. The method of claim 15, wherein interpretation filtering is performed only on two-dimensional segments.

17. The method of claim 14, wherein interpretation filtering is performed on segments on and near any corners.

18. The method of claim 17, wherein the segments form part of at least one of line ends, inner corners, outer corners, cutouts, slot ends, and jogs.

19. The method of claim 14, wherein interpretation filtering includes computing aerial image gradients at evaluation points on the segments.

20. The method of claim 19, wherein interpretation filtering further includes using the aerial image gradients to determine normal shifts to the segments.

21. The method of claim 13, further including performing a Boolean clean-up operation on at least one feature.

22. The method of claim 21, wherein the Boolean clean-up operation includes at least one of:

checking design rules (DRC);

filling notches; and

removing overlays.

23. The method of claim 13, further including performing a Boolean sizing operation.

24. The method of claim 13, further including performing a segment clean up.

25. The method of claim 13, wherein receiving, performing, and running can be implemented in a software tool.

26. The method of claim 13, wherein running optical proximity correction using the interpreted pattern generates a corrected pattern, the method further including performing interpretation filtering on the corrected pattern and then re-running optical proximity correction.

27. A computer-implemented program for performing optical proximity correction on a mask layout, the computer-implemented program comprising:

instructions for receiving the mask layout, the mask layout including a plurality of features;

instructions for performing interpretation filtering, the interpretation filtering generating an interpreted pattern for at least one feature; and

instructions for running optical proximity correction using the interpreted pattern.

28. The computer-implemented program of claim 27, further including instructions for dissecting edges of the features, thereby forming a plurality of segments.

29. The computer-implemented program of claim 28, further including instructions for identifying two-dimensional segments.

30. The computer-implemented program of claim 29, wherein the instructions for performing interpretation filtering are directed only to two-dimensional segments.

31. The computer-implemented program of claim 28, wherein the instructions for performing interpretation filtering are directed to segments on and near any corners.

32. The computer-implemented program of claim 31, wherein the segments form part of at least one of line ends, inner corners, outer corners, cutouts, slot ends, and jogs.

33. The computer-implemented program of claim 28, wherein the instructions for performing interpretation filtering compute aerial image gradients at evaluation points on the segments.

34. The computer-implemented program of claim 33, wherein the instructions for performing interpretation filtering use the aerial image gradients to determine normal shifts to the segments.

35. A method of generating an interpreted pattern of a mask layout feature, the mask layout including edges dissected into a plurality of segments, each segment having an evaluation point, the mask layout further including a space of at least a

predetermined size such that a line adjacent the space, when exposed during lithography, could have a bulbous line end, the method comprising:

identifying a two-dimensional segment on the line, the two-dimensional segment being adjacent the space;

measuring an aerial image gradient at the evaluation point of the two-dimensional segment;

determining a normal shift for the two-dimensional segment based on the aerial image gradient at the evaluation point;

modifying a position of the segment using the normal shift, wherein a modified position is outside the line; and

saving the modified position as part of the interpreted pattern.

36. The method of claim 35, wherein modifying includes choosing at least one constant in an equation, the constant being an empirically-derived fit constant based on sampled corner performance.